ADDENDUM

Date:	17 March 2006
To:	Contractors
From:	Vic Middleton, Project Manager, DFCM
Reference:	Uintah Basin ATC, Roosevelt, Utah Building Management System Upgrade
DFCM Project #:	05080250
Subject:	**Addendum No. 1**

Pages		
	Addendum	1 page
	Architectural Addendum	1 page
	Specification Section 15900	10 pages
	Total 8.5 x 11 Pages	12 pages

Reference the 8 ea Addendum #1 Existing Condition Drawings that are available on the DFCM Project Web page;
http://dfcm.utah.gov/main.php?project_number=05080250

Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

1.1 Schedule changes: There are no schedule changes per this Addendum.

1.2 Reference the attached Architectural Addendum, the new Section 15900 and the 8 (eight) referenced Drawings of existing conditions.

End of Addendum

Utah!
Where ideas connect

ADDENDUM 1

Modify and/or Delete Specifications as follows:

Change all Specification Headers to read:
Spectrum Engineers 20050564   Building Management System Upgrade
DFCM Project No. 05080250   Uinta Basin Applied Technology College

Section 01100.1.3.A. – Replace with
Project Identification to read "Building Management System Upgrade; DFCM Project No.
05080250

Section 01100.1.3.C.c.
DELETE

Section 01100.1.3.C.d.
DELETE

Section 15010 BASIC MECHANICAL REQUIREMENTS
DELETE

Section 15050 BASIC MECHANICAL MATERIALS AND METHODS
DELETE

Section 15194 FUEL GAS PIPING
DELETE

Section 15784 ROOFTOP UNITS
DELETE

Section 15815 METAL DUCTS
DELETE

Section 15820 DUCT ACCESSORIES
DELETE

Section 15855 AIR OUTLETS AND INLETS
DELETE

Section 15900.1.2.B
DELETE

Section 15900
REPLACE WITH ATTACHED

Section 15950
DELETE

Delete following Drawings
ME001
ME501
MH101
EE001
EP101

Add the following Drawings
Revised COVER SHEET
Existing Mechanical Drawings
Floor Plan

SECTION 15900 – BUILDING MANAGEMENT AND CONTROL SYSTEM

PART 1 - GENERAL

1.1   RELATED DOCUMENTS

A.   Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2   SUMMARY

A.   Scope of Work: (Base Bid, Yamas Controls)
1.   Provide new Building Management and Control System (BMCS) to replace the existing system in its entirety.
   a.   New BMCS shall be based upon the current Yamas , Inc. offering.
2.   Replace all existing pneumatic controllers, sensors, thermostats, relays and actuators with new DDC controls.
   a.   Provide new sensors, actuators and miscellaneous field devices as required to be compatible with the new Yamas System.
3.   Some, but not necessarily all of the items to be replaced include:
   a.   Removal of existing Global Control Module (GCM) replacing it with a new Universal Network Controller (UNC).
   b.   Provide ASD driver to allow the existing Network 8000 to communicate and operate under the new UNC.
   c.   Provide new Microzone II controllers to replace existing LCMs.
4.   Provide new DDC controllers to replace all existing pneumatic controllers.
5.   Provide new Yamas compatible sensors to replace pneumatic sensors.
6.   Provide new electric actuators to replace all existing pneumatic actuators.
7.   Provide WEB Browser Services to allow access from any client's WEB Browser on the Campus's Wide Area Network (WAN).
8.   Provide all necessary hardware and software engineering and programming for new UNC, ASD Driver, controllers, and WEB Services.
   a.   Software engineering and programming to include but not be limited to:
      1)   Creating new system graphics. Work with engineer and owner to create screens that show correct flow diagrams with appropriate dynamic data and control points for each major and minor system.
      2)   Providing new time schedules (adjustable from Clients WEB Browser) for each system as directed by the engineer.
      3)   Provide all necessary ASD/Network 8000 programming needed to monitor and control existing MicroZone II, PEM-1, and HPFC type controllers.
   b.   All operating and communication software shall be LonMark/LonWorks compliant along with complete compatibility with standard Ethernet interconnectability.
   c.   Provide all startup, test and commissioning services.
9.   Provide complete graphical package, including all system graphics for all existing as well as new systems. Graphics to include static diagrams of all major and minor mechanical systems (heating, cooling, fan, vav box, heat pumps etc.) using floor plan layouts, flow diagrams and unoccupied override status etc. Dynamic elements on static graphic to indicate commanded as well as status (on/off, alarm/normal etc.) condition, and analog

values (temperatures, pressures, actuator positions etc.) of all monitored and controlled points.

10. Provide communication lines for both existing and new DDC Controllers.

11. Provide new DDC Controllers as required to monitor and control new HVAC equipment.

B. Scope of Work: (Alternate Bid, Utah Controls)

1. Provide new Building Management and Control System (BMCS) to replace the existing system in its entirety.

   a. New BMCS shall be based upon the Utah Controls TAC System.

2. Replace all existing pneumatic controllers, sensors, thermostats, relays and actuators with new DDC controls.

   a. Provide new sensors, actuators and miscellaneous field devices as required to be compatible with the new TAC System.

3. Provide new DDC controllers to replace all existing pneumatic controllers.

4. Provide new TAC compatible sensors to replace pneumatic sensors.

5. Provide new electric actuators to replace all existing pneumatic actuators.

6. Provide WEB Browser Services to allow access from any client's WEB Browser on the Campus's Wide Area Network (WAN).

7. Provide all software engineering and programming to include but not be limited to:

   a. Creating new system graphics. Work with engineer and owner to create screens that show correct flow diagrams with appropriate dynamic data and control points for each major and minor system.

   b. Providing new time schedules (adjustable from Clients WEB Browser) for each system as directed by the engineer.

   c. All operating and communication software shall be TAC compliant along with complete compatibility with standard Ethernet interconnectability.

   d. Provide all startup, test and commissioning services.

8. Provide complete graphical package, including all system graphics for all existing as well as new systems. Graphics to include static diagrams of all major and minor mechanical systems (heating, cooling, fan, vav box, heat pumps etc.) using floor plan layouts, flow diagrams and unoccupied override status etc. Dynamic elements on static graphic to indicate commanded as well as status (on/off, alarm/normal etc.) condition, and analog values (temperatures, pressures, actuator positions etc.) of all monitored and controlled points.

9. Provide communication lines for both existing and new DDC Controllers.

10. Provide new DDC Controllers as required to monitor and control new HVAC equipment.

1.3 DEFINITIONS

A. BMCS: Building Management and Control System

B. DDC: Direct-digital controls.

C. E/P: Electronic to Pneumatic

D. LAN: Local area network.

1.4 SYSTEM DESCRIPTION

A. Control system consists of sensors, indicators, actuators, final control elements, interface equipment, other apparatus, accessories, and software connected to distributed controllers

operating in multi-user, multitasking environment on token-passing network and programmed to control mechanical HVAC systems.

1.5   SUBMITTALS

A.   Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and startup instructions for each type of product indicated.
   1.   Each control device labeled with setting or adjustable range of control.

B.   Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   1.   Schematic flow diagrams showing fans, pumps, coils, dampers, valves, and control devices.
   2.   Wiring Diagrams: Power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
   3.   Written description of sequence of operation.
   4.   Schedule of dampers including size, leakage, and flow characteristics.
   5.   Schedule of valves including leakage and flow characteristics.
   6.   Trunk cable schematic showing programmable control unit locations and trunk data conductors.
   7.   Listing of connected data points, including connected control unit and input device.
   8.   System graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations.
   9.   System configuration showing peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.

C.   Software and Firmware Operational Documentation: Include the following:
   1.   Software operating and upgrade manuals.
   2.   Program Software Backup: On a compact disc, complete with data files.
   3.   Device address list.
   4.   Printout of software application and graphic screens.
   5.   Software license required by and installed for DDC workstations and control systems.

D.   Software Upgrade Kit: For Owner to use in modifying software to suit future monitoring and control revisions.

E.   Field Test Reports: Indicate and interpret test results for compliance with performance requirements. Reports to include tend logs and graphical representation of trended data.

F.   Maintenance Data: For systems to include in maintenance manuals specified in Division 1. Include the following:

   1.   Maintenance instructions and lists of spare parts for each type of control device.
   2.   Interconnection wiring diagrams with identified and numbered system components and devices.
   3.   Keyboard illustrations and step-by-step procedures indexed for each operator function.
   4.   Inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
   5.   Calibration records and list of set points.

G.   Qualification Data: For firms and persons specified in "Quality Assurance" Article.

H.   Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors. Revise Shop Drawings to reflect actual installation and operating sequences.

1.6   QUALITY ASSURANCE

A.   Installer Qualifications: An experienced installer who is an authorized representative of the automatic control system manufacturer for both installation and maintenance of units required for this Project.

B.   Approved Suppliers:
        1.   Yamas Control Intermountain, Inc.
        2.   TAC Installed by Utah Controls

C.   Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D.   Comply with NFPA90A, "Installation of Air Conditioning and Ventilation Systems."

1.7   COORDINATION

A.   Coordinate location of all thermostats, and other exposed control sensors with plans and room details before installation.

B.   Coordinate equipment with Division16 Section "Fire Alarm" to achieve compatibility with equipment that interfaces with that system.

C.   Coordinate supply of conditioned electrical circuits for control units and operator workstation.

D.   Coordinate equipment with Owner to achieve compatibility with starter coils and annunciation devices.

PART 2 - PRODUCTS

2.1   MANUFACTURERS

A.   Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1.   Control Systems Components:
                a.   BEC Controls Corp.
                b.   Belimo Aircontrols (USA), Inc.
                c.   Erie Controls.
                d.   Functional Devices Inc.
                e.   General Eastern Instruments, Inc.
                f.   Honeywell, Inc.; Home & Building Control.
                g.   HyCal Sensing Products.

        h.   Invensys
        i.   IDEC USA
        j.   Johnson Controls, Inc.; Controls Group.
        k.   Mamac Systems.
        l.   Sensidyne, Inc.
        m.   TAC
        n.   Veris Industries
        o.   Vulcain Inc.

    2.   Approved DDC and BMCS Systems :
        a.   YAMAS, Inc.
        b.   TAC

2.2   DDC EQUIPMENT

A.   Provide new Operator Work Station. Workstation to include but not be limited to the following:
1.   Processor: Intel Pentium 4 Processor 530 (3.0 GHz or higher).
2.   512MB of 400MHz Non-ECC SDRAM memory
3.   Modem: 56K V.90 Data/Fax
4.   Network Interface Card: 3Com 10/100 Cat-5
5.   Monitor: 17" UltraSharp 1704FPT Flat Panel, Adjustable Stand, VGA/DVI
6.   Hard-Disk Drive: 80 GB SATA, 7200 RPM with Data Burst Cache (or larger).
7.   24X Max, Slimline DVD-CDRW Combo Drive with DVD Playback.
8.   Mouse: Optical Three button.
9.   Operating System: Microsoft Windows XP Professional or later.
10.   Microsoft Office

B.   Provide a WEB server capable of translating the BMCS data to WEB pages allowing access to override HVAC and Lighting Control points with appropriate security privileges.
1.   Access to the WEB will be provided by the Owner.
2.   Contractor to provide all programming to access BMCS data, WEB pages and Security functions. Coordinate requirements with building operator.
        a.   Provide complete software packages (IA-Lonn, Signal WS, Workplace Tec, and PSI for the old (Network 8000) and WEB services.

C.   Application Software: Include the following:
1.   Input/output capability from operator station.
2.   Operator system access levels via software password.
3.   Database creation and support.
4.   Dynamic color graphic displays.
5.   Alarm processing.
6.   Event processing.
7.   Automatic restart of field equipment on restoration of power.
8.   Data collection.
9.   Graphic development on workstation.
10.   Maintenance management.

D.   Control Units: Modular, comprising processor board with programmable, nonvolatile, random-access memory; local operator access and display panel; integral interface equipment; and backup power source.

1. Units monitor or control each input/output point; process information; execute commands from other control units, devices, and operator stations; and download from or upload to operator station.
2. Stand-alone mode control functions operate regardless of network status. Functions include the following:
    a. Global communications.
    b. Discrete/digital, analog, and pulse input/output.
    c. Monitoring, controlling, or addressing data points.
    d. Testing and developing control algorithms without disrupting field hardware and controlled environment.
3. Local operator interface provides for download from or upload to mobile operator station.

E. Local Control Units: Modular, comprising processor board with electronically programmable, nonvolatile, read-only memory; and backup power source.
    1. Units monitor or control each input/output point; process information; and download from or upload to operator station.
    2. Stand-alone mode control functions operate regardless of network status. Functions include the following:
        a. Global communications.
        b. Discrete/digital, analog, and pulse input/output.
        c. Monitoring, controlling, or addressing data points.
    3. Local operator interface provides for download from or upload to mobile operator station.

F. Software: Update to latest version of software at Project completion. Include and implement the following capabilities from the control units:
    1. Units of Measure: English.

2.3   CONTROL PANELS

A. Local Control Panels: Unitized existing cabinets where possible. If additional room is required, provide cabinets with suitable brackets for wall or floor mounting, located adjacent to each system under automatic control.

B. Fabricate panels of 0.06 thick, furniture-quality steel, or extruded-aluminum alloy, totally enclosed, with hinged doors and keyed lock and with manufacturer's standard shop-painted finish.
    1. Panel-Mounted Equipment: Temperature and humidity controllers, relays, and automatic switches; except safety devices. Mount devices with adjustments accessible through front of panel.
    2. Wiring Diagrams: Provide laminated-plastic control diagrams, which schematically show system being controlled. Include all wiring diagram with associated system.

2.4   SENSORS

A. Electronic Sensors: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.
    1. Resistance Temperature Detectors:
        a. Accuracy: Plus or minus 0.36 ºF at calibration point.
        b. Wire: Twisted, shielded-pair cable.
        c. Insertion Elements in Ducts: Single point, 8 inches long; use where not affected by temperature stratification or where ducts are smaller than 9 sf.

        d.   Averaging Elements in Ducts: 72 inches long, flexible; use where prone to temperature stratification or where ducts are larger than 9 sq. ft. as required.

        e.   Insertion Elements for Liquids: Brass socket with minimum insertion length of 2-1/2 inches.

        f.   Room Sensors: Plastic cover with temperature reset where indicated.

        g.   Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight.

B.   Equipment operation sensors as follows:

    1.   Status Inputs for Electric Motors: Current-sensing relay with current transformers, adjustable and set to 175 percent of rated motor current.

2.5 ACTUATORS

A.   Electronic Damper and Large-Valve Actuators: Direct-coupled type designed for minimum 60,000 full-stroke cycles at rated torque.

    1.   Valves: Size for torque required for valve close-off at maximum pump differential pressure.

    2.   Dampers: Size for running torque calculated as follows:

        a.   Parallel-Blade Damper with Edge Seals: 7 inch-pounds/sq. ft. of damper.

        b.   Opposed-Blade Damper with Edge Seals: 5 inch-pounds/sq. ft. of damper.

    3.   Coupling: V-bolt and V-shaped, toothed cradle.

    4.   Overload Protection: Electronic overload or digital rotation-sensing circuitry.

    5.   Fail-Safe Operation: Mechanical, spring-return mechanism. Provide external, manual gear release on non-spring-return actuators.

    6.   Power Requirements (Two-Position Spring Return): 24 V ac.

    7.   Power Requirements (Modulating): Maximum 10 VA at 24-V ac or 8 W at 24-V dc.

    8.   Proportional Signal: 2- to 10-V dc or 4 to 20 mA, and 2- to 10-V dc position feedback signal.

    9.   Temperature Rating: Minus 22 to plus 122º F.

    10.   Run Time: 60 seconds.

2.6 CONTROL VALVES

A.   Control Valves: Factory fabricated, of type, body material, and pressure class based on maximum pressure and temperature rating of piping system, unless otherwise indicated. Provide new Chilled Water Valves, reuse existing

B.   Characterized Ball Valves ½ to 2"

    1.   Stem – stainless steel

    2.   Seats – Fiberglass reinforced Teflon PTFE

    3.   Characterized disk – TEFZEL

    4.   Packing – 2 EPDM O-rings, lubricated

    5.   Pressure rating 600 psi (½" to 1 ¼") and 400 psi (1 ½" to 2").

    6.   Close off Pressure 200 psi

C.   Steam Valves

    1.   Body: Iron

    2.   Stem: 316 Stainless Steel

    3.   Plug: Bronze

    4.   Packing: TFE V-ring

    5.   ANSI Class 125 Flanged

D.   Terminal Unit Control Valves: Bronze body, bronze trim, two- or three-port as indicated, replaceable plugs and seats, union and threaded ends.
1.   Rating: Class125 for service at 125 psig and 250 F operating conditions.
2.   Sizing: 3-psig maximum pressure drop at design flow rate, to close against pump shutoff head.
3.   Flow Characteristics: Two-way valves shall have equal percentage characteristics; three-way valves shall have linear characteristics.

2.7   CONTROL CABLE

A.   Network jacks are to be provided and installed at all DDC panels for portable workstation communication. If additional or different communication cable is required by manufacturer, it shall be installed at no additional cost to the Owner.

PART 3 - EXECUTION

3.1   EXAMINATION

A.   Verify that conditioned power is available to all control units. Use existing power from old control panels.

B.   Verify that all existing control systems are in working order.
1.   Note those that are not working properly to the engineer for remediation.

3.2   INSTALLATION

A.   Install equipment level and plumb.

B.   Install software in control units and operator workstations.

C.   Implement all features of programs to specified requirements and as appropriate to meet existing sequences of operation.

D.   Connect and configure equipment and software to achieve the specified sequence of operation.

E.   Verify location of existing thermostats. New sensors are to be installed at existing thermostat locations and at new locations as shown on mechanical drawings.

F.   All control wiring to be concealed and installed in conduit whenever possible. Coordinate and obtain approval with engineer for any exposed control wiring prior to installation.

G.   Locate new sensors 60 inches above the floor.

H.   Install averaging elements in ducts and plenums in crossing or zigzag pattern.

I.   Install damper motors on outside of duct.

J.   Install labels and nameplates to identify control components according to Division 15 Section "Basic Mechanical Materials and Methods."

K.   Provide flow sensor calibration using a certified and design engineer approved Test and Balance Contractor on all VAV box Controls.

3.3   ELECTRICAL WIRING AND CONNECTION INSTALLATION

A.   Install raceways, boxes, and cabinets according to Division16 Section "Raceways and Boxes."

B.   Install building wire and cable according to Division16 Section "Conductors and Cables."

C.   Install signal and communication cable according to Division16 Section "Control/Signal Transmission Media."
1.   Conceal cable, except in mechanical rooms and areas where other conduit and piping are exposed.
2.   Install exposed cable in raceway.
3.   Install concealed cable in raceway.
4.   Bundle and harness multiconductor instrument cable in place of single cables where several cables follow a common path.
5.   Fasten flexible conductors, bridging cabinets and doors, along hinge side to protect against abrasion. Tie and support conductors.
6.   Number-code or color-code conductors for future identification and service of control system, except local individual room control cables.

D.   Connect manual-reset limit controls independent of manual-control switch positions.

E.   Connect hand-off-auto selector switches to override automatic interlock controls when switch is in hand position.

3.4   CONNECTIONS

A.   Ground equipment.
1.   Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.5   FIELD QUALITY CONTROL

A.   Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections. Report results in writing.
1.   Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove malfunctioning units, replace with new units, and retest.
2.   Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment, and retest.
3.   Calibration test electronic controllers by disconnecting input sensors and stimulating operation with compatible signal generator.

B.   Engage a factory-authorized service representative to perform startup service.

C.   Replace damaged or malfunctioning controls and equipment.
1.   Start, test, and adjust control systems.
2.   Demonstrate compliance with requirements, including calibration and testing, and control sequences.

3. Adjust, calibrate, and fine tune circuits and equipment to achieve sequence of operation specified.

D. Verify DDC as follows:
1. Verify software including automatic restart, control sequences, scheduling, reset controls, and occupied/unoccupied cycles.
2. Verify operation of operator workstations (Notebook and PC).
3. Verify local control units including self-diagnostics.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain control systems and components.
1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.
2. Provide operator training on data display, alarm and status descriptors, requesting data, executing commands, calibrating and adjusting devices, resetting default values, and requesting logs. Include a minimum of 40 hours' dedicated instructor time on-site.
3. Review data in maintenance manuals. Refer to Division 1 Section "Contract Closeout."
4. Review data in maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data."
5. Schedule training with Owner, through Architect, with at least seven days' advance notice.

3.7 ON-SITE ASSISTANCE

A. Occupancy Adjustments: Within one year of date of Substantial Completion, provide up to three Project site visits, when requested by Owner, to adjust and calibrate components and to assist Owner's personnel in making program changes and in adjusting sensors and controls to suit actual conditions.

END OF SECTION 15900